

IN THE CLAIMS:

Please cancel claims 1-10.

Please add the following new claims:

11. A method of exposing a resist on a substrate comprising the steps of:
- a) providing the substrate with a film of resist;
 - b) placing the substrate on a stage; and
 - c) sensing the position of the substrate with a displacement sensor.
12. The method as recited in claim 11, wherein the substrate comprises a wafer.
13. The method as recited in claim 12, wherein said wafer comprises a semiconductor.
14. The method as recited in claim 11, wherein the method further comprises the step of exposing said resist with radiation.
15. The method as recited in claim 14, wherein said radiation has a wavelength to provide a structure having a dimension less than 100nm.
16. The method as recited in claim 15, wherein said radiation comprises x-ray.
17. The method as recited in claim 16, wherein said x-ray radiation is collimated.
18. The method as recited in claim 16, wherein said x-ray radiation is concentrated.

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19. The method as recited in claim 14, further comprising the step of providing a mask for defining exposure of said resist.
20. The method as recited in claim 19, wherein said mask is spaced from said substrate by a gap, said method further comprising the step of moving said stage to adjust said gap.
21. The method as recited in claim 19, further comprising the step of using output of said displacement sensor to control said exposing step.
22. The method as recited in claim 21, wherein said mask is positioned with respect to said substrate, said method further comprising the step of exposing said resist at a time when said displacement sensor output indicates that position of mask with respect to said substrate is optimum.
23. The method as recited in claim 22, wherein said mask is spaced from said substrate by a gap, said method further comprising the step of exposing said resist at a time when said displacement sensor output indicates that said gap is optimum.
24. The method as recited in claim 19, further comprising the step of using the displacement sensor output to control mask to wafer misalignment.
25. The method as recited in claim 11, further comprising the step of using the displacement sensor output to control substrate x, y, z, rotation, and magnification.
26. The method as recited in claim 11, wherein the displacement sensor comprises a differential variable reluctance transducer (DVRT).

27. A system for exposing a substrate comprising a stepper and an X ray source, vibration insulation there between.

28. A system for exposing a substrate comprising a stepper and an X ray source, said stepper comprising a helium beam transport chamber.

29. A method of exposing a resist on a substrate, said method comprising the steps of:

providing the substrate with a film of resist;

placing the substrate on a stage;

providing a mask comprising a pattern; and

imaging said pattern on said resist at a precise moment when mask and substrate are in optimum position with respect to each other, wherein optimum position comprises one from the group, gap, x, y, z, rotation, and magnification.

30. The method as recited in claim 29, wherein the substrate comprises a wafer.

31. The method as recited in claim 30, wherein the wafer comprises a semiconductor.

32. The method as recited in claim 29, wherein said imaging comprises the step of exposing said resist with radiation.

33. The method as recited in claim 32, wherein said radiation has a wavelength to provide a structure having a dimension less than 100nm.